

Serial No.:

Inventor(s): David A. Cathey

Micron Technology, Inc. (A copy of this Office Action is provided in an appendix for the convenience of the Examiner.) Applicant canceled those claims in the parent application in order to pursue allowed claims. Applicant now stands ready to address these claims in the current application. Since the 1998 rejection, Congress has amended section 103(c) to state the following.

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Subject matter developed by another person, which qualifies as prior art only under . . . subsection[] (e) . . . of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

Section 102(e), in turn, addresses prior art in the form of a "patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent." Further, the change in section 103 applies to any application filed on or after May 29, 2000. (*See* section 4807(b) of the American Inventors Protection Act of 1999.)

The Doan reference was filed before but issued after Applicant filed the current application. (Doan was filed on April 27, 1993, the current Applicant enjoys a priority date of July 7, 1993, and Doan did not issue until December 13, 1994.) Thus, Doan qualifies as prior art only under subsection 102(e). Further, both the subject matter in Doan and the current claimed invention were, at the time the invention was made, assigned to Micron Technology, Inc. Finally, the current claims are being presented as part of a continuation application filed on or after May 29, 2000 (the continuation was filed on January 12, 2001). As a result, this application benefits from the new §103 provision. Accordingly, The Doan reference can no longer be cited against the claims as part of an obviousness rejection. Because the sole basis raised in support of the obviousness rejection is now untenable, Applicant requests that the Examiner withdraw the rejection and allow these claims. If there are any matters which may be resolved or clarified

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through a telephone interview, the Examiner is requested to contact Applicant's undersigned attorney at the number indicated.

Respectfully submitted,

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Appendix  
Parent's Office Action of 10/19/98



**UNITED STATES DEPARTMENT OF COMMERCE**  
**Patent and Trademark Office**

Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
037609.354	03/01/96	CATHEY	92-0466.02

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MM31/1019

EXAMINER

DAY, M

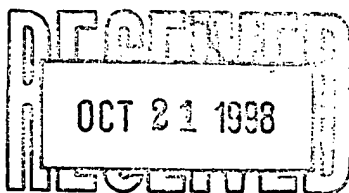
ART UNIT PAPER NUMBER

2875

DATE MAILED: 10/19/98

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**



# Office Action Summary

Application No.

08/609,354

Applicant(s)

D. Cathey

Examiner

M. Day

Group Art Unit

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—The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address—

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE three MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

## Status

- ☒ Responsive to communication(s) filed on Sept. 21, 1998
- ☒ This action is **FINAL**.
- ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- ☒ Claim(s) 14, 16-52 + 58-73 is/are pending in the application.
- Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- ☒ Claim(s) 14, 16-35, 38-48 is/are allowed.
- ☒ Claim(s) 36, 37, 49-52, 58-61, + 64-73 is/are rejected.
- ☒ Claim(s) 62 + 63 is/are objected to.
- ☐ Claim(s) \_\_\_\_\_ are subject to restriction or election requirement.

## Application Papers

- ☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.
- ☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.
- ☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.
- ☒ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119 (a)-(d)

- ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- ☐ All ☐ Some\* ☐ None of the CERTIFIED copies of the priority documents have been received.
- ☐ received in Application No. (Series Code/Serial Number) \_\_\_\_\_
- ☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_

## Attachment(s)

- ☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). \_\_\_\_\_ ☐ Interview Summary, PTO-413
- ☒ Notice of Reference(s) Cited, PTO-892 ☐ Notice of Informal Patent Application, PTO-152
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948 ☐ Other \_\_\_\_\_

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### **DETAILED ACTION**

1. Amendment D, filed 25 June 1998, and amendment E, filed 21 September 1998, have been entered.

2. Amendment D, filed 25 June 1998, overcomes the rejection of claims 53-57 under 35 U.S.C. 112, first paragraph. The rejection of claims 17, 27, 32, 39, and 41 under 35 U.S.C. 112, first paragraph is hereby withdrawn.

### ***Specification***

3. The disclosure is objected to because of the following informalities: Referring to page 8, line 11, reference numeral 13 does not appear in FIG. 3. Furthermore, it is generally not permitted to use the same reference numeral to indicate different structure. Consequently, the reference numeral 13 should not be use to indicate both "pillars" and emitter tips.

Appropriate correction is required.

### ***Claim Objections***

4. Claim 63 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim, or amend the claims to place the claims in proper dependent form, or rewrite the claims in independent form. Claim 63 fails to further limit the subject matter of claim 62. Claim 63

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requires the base only to be relatively pure in comparison to the apex, whereas claim 62 requires the base to be generally pure. The term "generally pure" is more restrictive than "relatively pure in comparison to the apex." It is noted that claim 61 requires the substrate to be a generally pure substrate. Consequently, "relatively pure in comparison to the apex" can not be interpreted to mean a purity greater than "generally pure" at least in context with the present invention.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

6. Claims 70-73 are rejected under 35 U.S.C. 102(e) as being anticipated by Doan et al. Doan et al. disclose an electron source comprising: a conductive film 12 (see FIG. 1, and 6A, and col. 1, lines 5-10, 29-33, and 43-51); and an emitter 13 having an apex and a base. Doan et al. are silent as to the emitter having a dopant concentration gradient (a plurality of conductivities) that is greater at the apex and decreases toward the base. In reference to FIG. 1, and 6A (see esp. col. 3, lines 29-33), Doan et al. teach that the emitter site region is formed by a diffusion doping process. Consequently, it is the Examiner's position that the emitter would inherently have a

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dopant concentration gradient that is greater at the apex and decreases toward the base as a result of the diffusion doping process.

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***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 36, 37, 58-61, 68-73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al. Referring to claims 36 and 37, Smith et al. disclose an emitter array comprising: an undoped substrate (see FIG. 1G & 7, and col. 4, lines 40-42); a plurality of tapered protuberances integral with a substrate, each protuberance having an apex and a base. Smith et al. are silent as to the emitter having a dopant concentration gradient that is greater at the apex and decreases toward the base. Smith et al. teach that the P-type and N-type regions may be formed by a diffusion doping process (see col. 8, lines 61-67). Consequently, it is the Examiner's position that the emitter would intrinsically have a dopant concentration gradient that is greater at the apex and decreases toward the base as a result of the diffusion doping process.

Referring to claim 58, Smith et al. disclose a cathode conductor system substantially as claimed. See the rejection of claim 36 above. Smith et al. are silent as to a field emitter



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comprising an undoped film disposed under the emitter. The Applicant discloses, however, that the undoped film is synonymous with a substrate (see page 7, esp. lines 1-23). Consequently, ~~claim 58 is rejected for substantially the same reason as claim 36.~~

Claims 59-61, and 68-73 are rejected for the same reason as claim 36.

9. Claims 36, 49-52, 58-60, and 64-69 are rejected under 35 U.S.C. 103(a) as being unpatentable over by Doan et al. Referring to claim 36, Doan et al. disclose an emitter comprising: an undoped substrate 11 (see col. 3, lines 5-10); a plurality of tapered protuberances 13 formed from a portion of the substrate (see lines 17-20); each protuberance including an apex; and a base (see FIG. 1, tip 13). Doan et al. are silent as to the emitter having a dopant concentration gradient that is greater at the apex and decreases toward the base. Doan et al. teach that the N-type region is formed by a diffusion doping process (see col. 3, lines 29-33, and also Smith et al., at col. 8, lines 52-67). Consequently, it is the Examiner's position that the emitter would intrinsically have a dopant concentration gradient that is greater at the apex and decreases toward the base as a result of the diffusion doping process.

Referring to claim 49, Doan et al. disclose an emitter of claim 36, wherein the emitter is disposed in a pixel (see col. 1, lines 60-64)

Claims 50-52, and 64 are rejected for the same reason as claim 49.

Referring to claims 58-60, Doan et al. disclose a field emitter comprising: a tapered protuberance integral with a substrate having an apex; and a base (see FIG. 7). Doan et al. are

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silent as to the emitter having a dopant concentration gradient that is greater at the apex and decreases toward the base. Doan et al. teach that the N-type region is formed by a diffusion doping process (see col. 3, lines 29-33, and also Smith et al., at col. 8, lines 52-67).

Consequently, it is the Examiner's position that the emitter would inherently have a dopant concentration gradient that is greater at the apex and decreases toward the base as a result of the diffusion doping process.

Still referring to claim 58, Doan et al. do not disclose a field emitter comprising an undoped film disposed under the emitter. The Applicant discloses, however, that the undoped film is synonymous with an undoped substrate (see page 7, esp. lines 1-23).

Claim 60 is rejected for the same reason as claim 58, and claim 61 are rejected for the same reason as claim 36.

Claims 65-67 are directed to product-by-process claim limitations and are not afforded patentable weight. Furthermore, it is noted that the functional language of a "etch-resistant quantity" or "oxidizable quantity" is intrinsic to the dopant concentration gradient. Consequently, the subject claims are rejected for the same reason as claim 36.

Claims 68, an 69 are rejected for the same reason as claim 36.

### ***Response to Arguments***

10. Applicant's arguments in D, filed 25 June 1998, have been fully considered.

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11. Referring to page 4 of amendment D, filed 25 June 1998, the Applicant's arguments with respect to claims 53-57 are moot because the subject claims have been cancelled.

12. Referring to page 5 of amendment D, the Applicant's arguments are persuasive. The rejection of claims 17, 27, 32, 39, and 41 under 35 U.S.C. 112, first paragraph is withdrawn.

13. Referring to page 6, the Applicant alleges that claim 70 recites a film under the emitter having a generally constant first conductivity where as Smith teaches n and p doped regions and therefore the present invention does not read on the prior art. The Examiner respectfully disagrees. The fact that Smith includes p-doped regions surrounding n-doped regions does not exclude n-doped regions having a generally constant first conductivity disposed under the emitter. It is the Examiner's position that the claimed limitations read on the teachings of Smith. Furthermore, an open preamble does not exclude additional elements.

14. Referring to page 9, in reference to claims 14, 23, 28, 36, 37, 38, 40, 45, 58, 61, 68, and 70, the Applicant alleges that neither Smith, nor Doan disclose an emitter having a dopant concentration of zero at the base. The Applicants argument is not commensurate with the scope of claims 36, 58, 61, 68, and 70 which read on a relatively undoped silicon substrate. The Examiner concurs, however, that neither Smith, nor Doan teach or suggest an emitter having a

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dopant concentration of zero at the base. The rejection of claims 14, 23, 28, 40, and 45, under 35 USC 103 is withdrawn.

15. Referring to the second full paragraph of page 11, the Applicant alleges that because process limitations are allegedly found in prior art U.S. patents, therefore process limitations have been afforded patentable weight. Patentability is generally determined on a case by case basis. In the instant case, the process limitations have not been afforded patentable weight. See MPEP 2113

***Allowable Subject Matter***

16. Claims 14, 16-35, and 38-48 are allowed over the prior art of record.

17. Claim 62 is objected to as being dependent upon a rejected base claim, but would be allowable over the prior art of record if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

18. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

19. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.


20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Day whose telephone number is 703/305-4941. The examiner can normally be reached on Monday-Friday, from 8:00 A.M. to 5:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sandra O'Shea, can be reached by phoning 703/305-4939. The Fax phone number is 703/308-7382.

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Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is 703/305-4900.

October 12, 1998



**MICHAEL DAY  
PATENT EXAMINER  
GROUP 2200**



**Sandra O'Shea  
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Technology Center 2800**